

CLAIMS:

1. An MR system for MR imaging, including:
 - an open main field magnet with two main field magnet poles which are arranged on opposite sides of an examination zone in order to generate a magnetic main field;
 - a gradient coil system with a plurality of gradient coils for generating magnetic gradient fields;
 - an RF coil system for transmitting and/or receiving RF signals with two planar RF coil arrays which are situated on opposite sides of the examination zone, each RF coil array including at least two RF coils which are decoupled from one another and are connected to a respective channel of a transmit/receive unit;
- 10 - a transmit/receive unit which includes a respective channel for an RF coil of the RF coil system, each RF coil being separately controllable in the transmission mode;
- a control unit for controlling the MR imaging; and
- a processing unit for processing received MR signals.
- 15 2. An MR system as claimed in claim 1, characterized in that the two RF coil arrays are decoupled from one another.
3. An MR system as claimed in claim 1, characterized in that RF cables, notably of the length $\lambda/2$ or $\lambda/4$, capacitances, impedance circuits and/or transformers are provided 20 for the decoupling of the individual RF coils of the respective RF coil array.
4. An MR system as claimed in claim 1, characterized in that the RF coils are formed by planar resonant conductors and that the RF coil arrays include a plurality of mutually perpendicularly arranged strips.
- 25 5. An MR system as claimed in claim 1, characterized in that the RF coils are formed by surface antennas, notably rectangular surface antennas.

6. An MR system as claimed in claim 1, characterized in that the RF coils are formed by butterfly coils.

7. An MR system as claimed in claim 1, characterized in that the RF coils of each time one RF coil array are arranged on a single board or on two boards, the means for the decoupling of the individual RF coils then being integrated.

8. An MR system as claimed in claim 1, characterized in that the control unit is arranged to control the MR system so as to carry out MR imaging in conformity with the SENSE method, for active RF control, for local pre-saturation, for parallel transmission and reception of signals and/or for feedback control of the RF homogeneity.

9. An MR system as claimed in claim 1, characterized in that the transmit/receive unit comprises n transmit channels which can be controlled independently of one another for the control of amplitude, phase and shape of the excitation pulses.

10. A planar RF coil array for an RF coil system of an MR system as claimed in claim 1 which is to be arranged on opposite sides of the examination zone and is intended for transmitting and/or receiving RF signals by means of at least two RF coils which are decoupled from one another, each RF coil being connectable to a respective channel of a transmit/receive unit of the MR system and each RF coil being separately controllable in the transmission mode.